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An Exploration of Nurse Educators' Critical Thinking

by

Christy L. Raymond

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the
requirements for the degree of Master of Education

In
Adult and Higher Education

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Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled ***An Exploration of Nurse Educators' Critical Thinking***, submitted by ***Christy L. Raymond*** in partial fulfillment of the requirements for the degree of ***Master of Education*** in ***Adult and Higher Education.***

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ABSTRACT

The critical thinking abilities and dispositions of nurse educators are integral to facilitating the critical thinking of nursing students. This descriptive, exploratory study measures and describes nurse educators' critical thinking. Using the California Critical Thinking Disposition Inventory (CCTDI) and the California Critical Thinking Skills Test (CCTST), quantitative measurements were obtained from 11 full-time nurse educators conveniently sampled from a baccalaureate nursing program in Alberta. Six of the 11 nurse educators also participated in an interview, which captured their varied descriptions of critical thinking; factors that positively and negatively influence their critical thinking; and common approaches they utilize to facilitate critical thinking. Some positive correlations were found between the participants' years of experience as a registered nurse (RN) and the CCTDI and CCTST. The results of this study suggest nurse educators have a moderately high inclination and ability to think critically.

Key Words: Critical Thinking, Critical Thinking Skills, Critical Thinking Dispositions, Nurse Educators

DEDICATION

This work could not have been possible without the support from those who have encompassed my cheerleading section. My family, friends, and the educators that I have encountered are the transmitters and receivers of my abundant positive chi.

"Learning without thought is labor lost;

thought without learning is perilous".

Confucius, The Confucian Analects

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TABLE OF CONTENTS

	PAGE
Chapter I: Introduction	1
Research Interests	1
Significance	3
Definition of Terms	3
Critical Thinking in Nursing: Definition and Context	4
Statement of Need	8
Assumptions	9
Research Questions	9
Chapter II: Review of the Literature	11
Critical Thinking Foundations in Adult Education	11
Critical Thinking Measurement	14
Critical Thinking as an Outcome of Nursing Education	17
Critical Thinking Abilities of Nurse Educators	20
Strategies to Facilitate Critical Thinking and Potential Barriers	22
Overview	26
Chapter III: Methods and Design	27
Sampling and Ethical Considerations	28
Methodology	29
Instruments	29
Interview	31
Pilot Testing	32

Data Analysis and Interpretation ---------- 33

Trustworthiness ---------- 34

Reliability and Dependability ---------- 34

Validity, Credibility, and Transferability ---------- 35

Limitations and Delimitations ---------- 36

Chapter IV: Findings and Discussion ---------- 38

Characteristics of the Sample ---------- 38

Program Description ---------- 38

Demographic Data ---------- 39

The Role of Critical Thinking for Nurse Educators ---------- 40

Nurse Educators' Definition or Description of Critical Thinking --- 41

Nurse Educators' Critical Thinking Skills and Dispositions --------- 44

Critical Thinking Strategies Used by Nurse Educators ---------- 52

Positive and Negative Factors that Impact Nurse Educators' Critical Thinking ---------- 55

The Relationship Between Sample Characteristics and Critical Thinking Scores ---------- 59

The Relationship Between Critical Thinking Scores and How Nurse Educators Define or Describe Critical Thinking --------- 61

The Relationship Between Critical Thinking Scores and Methodologies ---------- 64

Chapter V: Summary, Findings, Implications, Recommendations and Conclusion ---------- 67

Summary ---------- 67

Findings ---------- 68

Implications ---------- 69

Faculty Development Activities ---------- 69

The Field of Critical Thinking ---------- 70

Recommendations ---------- 70

Conclusion ---------- 72

References ---------- 73

Appendices

Appendix A – Letter of Invitation ---------- 80

Appendix B – Letter of Consent ---------- 82

Appendix C – Demographic Survey ---------- 83

Appendix D – Interview Guidelines ---------- 84

Tables

Table 1 Nurse Educators' CCTDI Sub-Scale Scores ---------- 45

Table 2 Correlations from the CCTDI ---------- 47

Table 3 Nurse Educators' CCTST Sub-Scale Scores ---------- 48

Table 4 Nurse Educators' Perceived Scores on the CCTDI and the CCTST ---------- 51

Table 5 Strategies that Nurse Educators Utilize in Classroom and Clinical Settings to Facilitate Critical Thinking---------- 53

Table 6 Factors that Negatively Influence Nurse Educators' Development of Critical Thinking ---------- 56

Table 7 Correlations Between Nurse Educators' Demographic Variables and Scores from the CCTDI and the CCTST ------- 60

An Exploration of Nurse Educators' Critical Thinking

Chapter I – Introduction

The term critical thinking is integral to the literature on higher education. The ability to think critically is an essential element of higher education and more specifically, nursing education (Daly, 1998; Kurfiss, 1988; McPeck, 1981; Thompson & Rebeschi, 1999). Propelled by accreditation mandates, critical thinking has been included as an outcome of nursing educational programs because of its contribution to quality nursing care. Critical thinking is required by nurses to manage the increasing acuity of patients and to adjust to the constantly changing nature of the health care system. Therefore, it is important to understand how critical thinking abilities of key individuals, such as nurse educators, impact nursing students' abilities to think critically and attain the skills necessary to provide quality nursing care. By exploring the critical thinking of nurse educators, critical thinking can be better described, which will aid in the understanding and implementation of effective teaching practice.

Research Interests

When I started my nursing career I knew that nurses required complex thinking skills to adapt and implement a variety of nursing interventions required in any given situation. The ability to think about and apply several concepts simultaneously is at the heart of quality nursing care. Now, as a nurse educator, I realized that 'higher order thinking' is required to facilitate student thinking. Higher patient acuity; on-going changes to patient care modalities; and nurses' increased responsibility and workload have highlighted the need for critical thinking when

nurses practice in unstable health care systems (Daly, 1998). Therefore, nurse educators are required to think, act, and teach critically to facilitate the development of critical thinking in nursing students. This will ensure new graduates possess the skills and abilities required to cope with the ever-changing and complex health care systems. This requirement of nurse educators has stimulated my interest to explore critical thinking of nurse educators as a first step towards understanding how educators influence students' critical thinking. I have a vested interest to further understand this aspect of critical thinking to better my teaching practice and to facilitate knowledgeable and thoughtful nursing practice for students. To effectively evaluate and facilitate the critical thinking of others, I too must know and understand what critical thinking entails.

Significance

The significance of this study is underscored by the goal to promote critical thinking in nursing students to meet the rapidly changing demands of the profession (Daly, 1998). Within educational programs, evidence must be provided to governing bodies that new graduates have critical thinking abilities. There is no question that critical thinking is a highly valued skill required in nursing. In the past, studies have emphasized the need to measure critical thinking as an outcome, whereas the process required to facilitate critical thought has been overlooked (Howell Adams, Whitlow, Stover, & Williams Johnson, 1996; Leppa, 1997; Thompson & Rebeschi, 1999). In nursing education, nurse educators and their critical thinking abilities are important to facilitate students' critical thinking. By examining the critical thinking skills and dispositions of nurse educators, more can be learned about the intricate process of

facilitating critical thinking in nursing education. As evident in the literature review in Chapter II, a clearer definition of critical thinking and more information about how it exists in nurse educators is required.

Definition of Terms

Critical Thinking. Although much is known and written about this concept, many aspects of critical thinking remain to be learned and explored. Many scholars have developed definitions of critical thinking yet there is no consensus definition for this concept (Brookfield, 1987; DeYoung, 2003; Garrison, 1991; Kurfiss, 1988; McPeck, 1981; Paul, 1992). This lack of consensus has contributed to some confusion, misunderstanding, and the misuse of critical thinking as a catch phrase that includes all 'higher order' thinking.

The definition of critical thinking used for this research study was developed for the American Philosophical Association (APA) using a Delphi technique under the direction of Facione (1990). "Critical thinking is the process of purposeful, self-regulatory judgment. This process gives reasoned consideration to evidence, context, conceptualizations, methods and criteria" (Facione, 1990, p. 2).

In addition, the dispositions necessary for critical thinking are reflected in the following definition of the ideal critical thinker:

> ...habitually inquisitive, well informed, trustful of reason, open minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused on inquiry, and persistent in seeking results

> which are precise as the subject and the circumstance of inquiry permit (Facione, 1990, p. 3).

These definitions serve as the basis for the development of the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI), which are used in this study to measure the critical thinking abilities and dispositions of nurse educators.

Critical Thinking in Nursing: Definitions and Context

Critical thinking has become increasingly popular in the context of nursing education. Similar to adult education, much literature exists in nursing about the importance of critical thinking. In addition, the definitions and models that have been created provide description of this complex skill.

The importance of critical thinking in nursing is linked to a) rapidly occurring changes in health care b) a decreased focus on positivistic, rule driven logic, and c) the overall emphasis on cognition in addition to skill-centered nursing care (Daly, 1998). As well, many governing professional bodies have identified critical thinking as an integral skill required for competent nursing practice. For example, the Alberta Association of Registered Nurses (AARN) included critical thinking as part of the *Nursing Practice Standards* (1999). Going beyond the status quo and advancing nursing practice requires the use of critical thought by the nursing profession (Daly, 1998). Clinical judgment is an important nursing skill and is linked to critical thinking. For example, Alfaro-Lefevre (1995) described clinical judgment as "critical thinking in the clinical area" (p. 45). Nurses must utilize clinical judgment and decision-making skills in order to meet the needs of changing environments. Critical

thinking is an essential component of clinical judgment, which is required to provide quality nursing care.

Many nurse researchers interested in studying critical thinking have borrowed definitions from the field of education. This may be due in part to limited research that has identified a nursing specific definition. There are two studies that utilize a cross-discipline definition of critical thinking as the basis for the research. Utilizing the definition from the American Philosophical Association (Facione, 1990), Gordon (2000) compared the perceptions of nurse educators and non-nurse scholars on how they defined critical thinking. Gordon (2000) found that nurse scholars defined critical thinking differently than non-nurse scholars. In Gordon's (2000) study, nurses were less likely to agree that the cognitive activities of interpretation, explanation, and self-regulation were critical thinking skills. Although no significant difference of opinion was found regarding the dispositions identified by non-nurse scholars, nurse educators were inclined to include leadership, trustworthiness, and sensitivity in their definition of critical thinking. It is not clear in the study by Gordon (2000) why the participants defined critical thinking differently in a nursing context. Based on this study it may be concluded that nurse scholars have a different conceptualization of critical thinking compared to other disciplines. This study also highlighted the fact that nurse scholars may be undecided as to what components of previously identified critical thinking definitions fit best with the varied and complex nature of nursing contexts.

Another recent study by Scheffer and Rubenfeld (2000) used a Delphi technique with international nurse scholars to formulate a consensus definition.

Similar to the Delphi study lead by Facione (1990) to develop a critical thinking definition for the American Psychological Association (APA), Scheffer and Rubenfeld developed the following definition:

> Critical thinking in nursing is an essential component of professional accountability and quality nursing care. Critical thinkers in nursing exhibit these habits of the mind: confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection. Critical thinkers in nursing practice the cognitive skills of analyzing, applying standards, discriminating, information-seeking, logical reasoning, predicting and transforming knowledge (Scheffer & Rubenfeld, 2000, p. 357).

Based on Facione's (1990) work on the APA definition, Scheffer and Rubenfeld's study identified two additional attributes specific to nursing. These attributes were creativity and intuition. It is evident that both Gordon's and Scheffer and Rubenfeld's studies utilized aspects of the APA consensus statement (Facione, 1990). The APA definition of critical thinking has been a useful and a valuable contribution to the field of adult education and other disciplines such as nursing.

Critical thinking has been applied specifically to nursing contexts through the development of several models or conceptual frameworks. Kataoka-Yahiro and Saylor (1994) developed a critical thinking model for clinical judgment based on a compilation of ideas from Ennis and Kurfiss. This model depicts a hierarchical relationship between the identified components of critical thinking (standards, attitudes, competencies, experiences, and specific knowledge base) and the levels of

critical thinking (basic, complex and commitment). The outcome of these combined concepts and levels is clinical judgment in a nursing context.

Another model, developed by Ford and Profetto-McGrath (1994), situates critical thinking within a nursing curriculum that fosters reflection and action. Combining the elements of knowledge, critical reflection, and action, this model aligned curriculum with more current paradigmatic views. Teaching which is focused on technical and practical application needs to be transformed into a curriculum where students develop a critical consciousness (Ford & Profetto-McGrath, 1994). This model displayed the shift nursing has made from traditional problem solving to more reflective action-based education.

Videbeck (1997b) added to Ford and Profetto-McGrath's model by creating a framework that emphasized a clearer conceptualization of evaluating critical thinking at the nursing program level. In response to American mandates prompted by the National League for Nursing Accrediting Commission (NLNAC), nursing education programs are expected to produce graduates who think critically. This focus on critical thinking as an outcome of nursing education has made evaluating critical thinking a very popular topic among nurse researchers. Videbeck (1997b) described this evolutionary evaluative process in three phases: defining critical thinking, operationalizing critical thinking in the learning environment, and evaluating critical thinking as a student outcome. This model served as a catalyst for a multitude of works that explored ways to evaluate critical thinking in nursing programs.

Overall, the nursing literature related to critical thinking has utilized the foundations of adult education to further describe its practice. Identifying the

importance of critical thinking in nursing, comparing and developing context specific definitions, and outlining conceptual frameworks, have greatly contributed to the depth and breath of knowledge related to critical thinking in nursing. Jacobs, Ott, Sullivan, Ulrich, and Short (1997) observed that a continued focus on the evaluation of critical thinking in nursing will change the definition of critical thinking and the measures utilized as further research is completed. To date this has not fully occurred.

Statement of Need

Nurse educators are expected to use educational strategies that develop students' critical thinking abilities in the classroom, laboratory, and a variety of practice settings. To fulfill this expectation nurse educators need to have well-developed critical thinking skills. Unfortunately the critical thinking of nurse educators has not been comprehensively explored in the literature. More specifically, research examining nurse educators' critical thinking abilities and their dispositions for critical thinking is sparse. Based on a literature search that examined published work from 1990 to 2003, there was only one article and three dissertations identified that directly related to this topic. It is evident that the exploration of nurse educators' abilities to think critically requires additional research to determine effective measurement techniques (i.e., instruments), the need for and types of faculty development approaches related to critical thinking, and nurse educators' reflection on what it means to think critically. It is also important to investigate nurse educators' perspectives on critical thinking and how they define it and practice it within nursing education settings. The purpose of this study was to explore the critical thinking abilities of nurse educators, their understanding of critical thinking, and how they

operationalize it in their teaching practice. The exploration of these topics adds to the knowledge base of critical thinking in nursing education and can further direct research in this area.

Assumptions

The relevant assumptions that are included and acknowledged in this exploration of critical thinking abilities of nurse educators are:

1. Critical thinking is integral to nursing and is an important goal of higher education.
2. Critical thinking is defined differently in a variety of contexts and its operationalization depends on the environment in which it is being utilized or referenced.
3. Critical thinking is complex and includes several intricate components.
4. Critical thinking encompasses both skills and dispositions.
5. Critical thinking can be taught and facilitated in teaching and learning interactions in a variety of settings.

Research Questions

The research questions guiding this study are:

1. How do nursing instructors define or describe critical thinking?
2. What are nurse educators' critical thinking skills (CTS) and critical thinking dispositions (CTD) as measured by the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI)?

3. What critical thinking strategies do nurse educators utilize as part of their teaching?
4. What factors, from the perspective of nurse educators, positively and negatively impact nurse educator's critical thinking abilities and development?
5. What is the relationship of nurse educators' ages, levels of educational qualification, and years of teaching experience when correlated with critical thinking skills and critical thinking disposition scores?
6. What is the relationship between critical thinking abilities of nurse educators as measured by the CCTST and the CCTDI and how nurse educators define or describe critical thinking?
7. What is the relationship between the data collected from the CCTST and the CCTDI and the teaching methodologies nurse educators use to facilitate critical thinking in a learning interaction?

Chapter II: Review of the Literature

The literature on critical thinking is plentiful and diverse. In Chapter I, critical thinking in nursing was described. In addition to critical thinking in nursing I wish to also review pertinent areas related to this research study. The literature reviewed has been categorized according to the following five themes:

1. Critical Thinking Foundations in Adult Education
2. Critical Thinking Measurement
3. Critical Thinking as an Outcome of Nursing Education
4. Critical Thinking Abilities of Nurse Educators
5. Strategies to Facilitate Critical Thinking and Potential Barriers

Critical Thinking Foundations in Adult Education

In order to fully understand how critical thinking has come to find space (meaning) and place (relevance) in nursing education, the broader landscape of adult education is explored. The first important area of exploration is the definition of critical thinking. Many authors in adult education have cited the importance of critical thinking, however there is no agreed upon definition (Brookfield, 1987; DeYoung, 2003; Garrison, 1991; Kurfiss, 1988; McPeck, 1981; Paul, 1992). McPeck (1981) defined critical thinking as "the propensity and skill to engage in an activity with reflective scepticism" (p. 8). This definition highlights the broad process of metacognition, whereby an individual is able to reflect on his or her own thinking. Similar to McPeck, Brookfield (1987) described critical thinking as a "calling into question the assumptions underlying our customary, habitual ways of thinking and acting and then becoming ready to think and act differently on the basis of this critical

questioning" (p. 1). Brookfield highlighted the importance of reflecting on one's thinking in order to think and act in a more complex manner. In Brookfield's definition, the concept of acting on one's thinking is evident. Kurfiss (1988) added to the multi-layered discussion by defining critical thinking as a more rigid problem-solving endeavor, which serves to find a justifiable end to an identified dilemma. Another definition is offered by Paul (1992), who described critical thinking as "disciplined, self-directed thinking that exemplifies the perfections of thinking appropriate to a particular mode or domain of thought" (p. 9). Paul (1992) extended his definition by distinguishing between a strong and weak sense of critical thinking. Paul (1992) states if the focus of the thought processes pertains to interests of diverse populations or groups this demonstrates a strong sense or fair-minded critical thinking. Conversely, if the focus of the thought processes is on one particular group this demonstrates a weak sense of critical thinking (Paul, 1992). Although McPeck, Brookfield, Kurfiss and Paul provide a few of the long-standing definitions, they exemplify diverse attempts to capture the nature of critical thinking.

A review of the definitions found in the adult education literature points to several concepts. The most prominent concept linked to definitions of critical thinking is Dewey's notion of reflection. He emphasized the importance of this concept in his comment that "the better way of thinking … is called reflective thinking" (Dewey, 1933, p. 3). Through this reflective activity, there is a "demand for the solution of a perplexity…" (p. 14). Similar to Dewey's notion of reflective thinking is McPeck's (1981) focus on reflective scepticism as a key attribute of critical thinking. He asserted that critical thinking does not involve an "indiscriminate

scepticism, for that would ultimately be self-defeating... rather it is the appropriate use of reflective scepticism" (1981, p. 7), which involves experience and knowledge of the questions to ask about a certain issue.

Rational or logical thought is another concept emerging from the literature. Even though rational thought is an integral part of critical thinking, it does not capture the whole of what it means to think critically. Ennis (1993) defined critical thinking as "the correct assessment of statements" (p. 179). This definition emphasizes critical thinking as a logical problem solving activity. Kurfiss (1988) takes a similar approach by referring to critical thinking as an investigation. From this definition, Kurfiss clarified that although critical thought does involve problem solving, this problem solving focuses on more "ill- structured" issues versus the narrow confines of well-structured problems. Although logical thought is involved in the process of critical thinking, McPeck (1981) argued that it plays a comparatively minor role.

An area of increasing interest is the role of the affective domain in critical thinking. Dewey, as early as 1933, highlighted the importance of "attitudes" in critical thinking by asserting "knowledge of the methods alone will not suffice" (p. 30). He argued that there needs to be a personal desire, which is driven by disposition, in order to utilize the methods of complex thought. Paul (1992) makes a similar assertion by outlining important "traits of mind", which are integral to his definition of critical thinking.

Some authors stress the importance that critical thinking should be thoroughly explored within a variety of contexts. Brookfield (1987) emphasized that critical thinking is crucial and necessary for us to understand our current situations in life, to

envision possibilities for a better future, and to be politically literate in a complex and perplexing world. Kurfiss (1988) underscored the importance of critical thinking by explaining that contemporary life has become even more complex, and thus requires increased rationality. The work of Brookfield and Kurfiss support that critical thinking abilities can be valuable on personal, social, and political levels. They also believe that individuals can transfer critical thinking abilities to different areas of their life; however this assumption is contested terrain in the literature.

Generalizability of critical thinking and its transferability to other contexts is another focus found in adult education literature. McPeck (1981) clearly claimed that critical thinking requires subject specific knowledge on which to base one's thinking. He argued that critical thinking cannot be separated from the subject matter and is therefore limited in its transferability. Paul (1992) also agreed "knowledge exists in and through critical thought" (p. 5), where each discipline employs a different mode of thinking. Norris (1992) disagreed with McPeck and Paul by stating that if certain conditions or understandings are achieved, critical thinking can be transferred between subject matters. Norris (1992) also added that the generalizability of critical thinking relies heavily on its definition or meaning. It appears, by authors such as Norris (1992), that the critical thinking literature in the adult education field is influenced by the various definitions utilize by authors to define this complex term.

Critical Thinking Measurement

The measurement of critical thinking in nursing education integrates principles from the field of adult education. According to Ennis (1993), the reasons for assessing students' levels of critical thinking are to measure the level of critical

thinking, give feedback, motivate the student, inform teachers, facilitate admission decisions, and enforce school accountability. Although these reasons are valid justification for measuring students' critical thinking, there are cautionary considerations to acknowledge in any measurement process (Ennis, 1993). Some negative influences which can alter the validity of the measurement results include poor timing when measurement is taken, increased pressure created by the measurement process, incompatible tool design for the specified environment, and the effect of limited resources on administering the measurement instruments.

Ennis (1993) also focused some of his work on the selection of assessment tools. Currently there are no discipline specific measurement tools, therefore individuals interested in measuring critical thinking must choose cross-discipline ones. It is important to select a measurement instrument whose definition of critical thinking is compatible and comparable with the environment in which it will be utilized (Ennis, 1993). Ennis (1993) further pointed out the need to develop discipline specific critical thinking assessment tools in the field of education.

Within the nursing literature there is a similar need to explore the development of discipline specific measurement approaches (Hicks, 2001). Hicks (2001) noted that nursing often adapts definitions from the educational context; thus utilizing measurement instruments consistent with these definitions. Many of the instruments that are utilized in nursing education yield quantitative data. These quantitative tools include the previously popular Watson-Glaser Critical Thinking Appraisal (WGCTA). The WGCTA has been used most frequently in nursing research, measuring critical thinking as a combination of knowledge, skills and

attitudes (Howell Adams, Whitlow, Stover, & Williams Johnson, 1996; Watson-Glaser, 1980, cited in Hicks, 2001). Important concepts such as reflection and context are missing from the WGCTA. Due to inconsistent results, the use of the WGCTA has decreased in frequency as a measure of critical thinking in nursing.

The use of the California Critical Thinking Skills Test (CCTST) and the California Critical Thinking Disposition Inventory (CCTDI) has increased over the last ten years (Howell Adams et al., 1996). The CCTST and the CCTDI were developed based on the APA's definition that includes both skills and dispositions as important components of critical thinking (Facione, 1990; Hicks, 2001). The CCTST and the CCTDI provide detailed subscales and have demonstrated a conceptual link to critical thinking in the nursing context (Hicks, 2001).

The use of commercialized tests (i.e., WGCTA, CCTST, and CCTDI) is more appealing and more realistic for researchers instead of developing new measurement tools (Rane-Szostak & Fisher Robinson, 1996). Given their established reliability and validity, cross-disciplinary tools are often chosen and utilized in nursing. However, the use of commercialized, cross-discipline instruments warrants further exploration specific to their validity, reliability, suitability, and use-ability for each specific discipline and research environment (Rane-Szostak & Fisher Robinson, 1996). Many studies (Leppa, 1997; McCarthy, Schuster, Zehr, & McDougal, 1999; Thompson & Rebeschi, 1999) have utilized measurement instruments as part of quantitative research designs; however the need to balance quantitative research efforts with qualitative exploration has also been highlighted in the literature.

Recently there has been more recent emphasis on utilizing qualitative approaches to measure critical thinking in nursing education because of the potential inability of quantitative measures to accurately capture the process of critical thinking. The lack of exploration surrounding the complex teacher-student interaction is another reason why qualitative techniques should be strongly considered in addition to the popular quantitative methods (Hicks, 2001). Hicks (2001) advocated the use of interviews and phenomenological approaches as two examples.

In conclusion, measurement of critical thinking as an outcome of nursing education has been challenging and achieved primarily by using quantitative approaches. This use of primarily quantitative measures categorizes critical thinking more as an outcome versus a combination of an outcome and process. The utilization of cross-discipline commercial tools has highlighted the need for further exploration of tool utilization and the development of nursing specific measurement techniques.

Critical Thinking as an Outcome of Nursing Education

The majority of the nursing literature related to measuring critical thinking focuses on measuring critical thinking abilities and the related variables that affect it (i.e., GPA, year of an educational program students are completing). These studies were conducted to ascertain whether a nursing education program affected students' critical thinking (Howell Adams, Whitlow, Stover, & Williams Johnson, 1999; Leppa, 1997; McCarthy, Schuster, Zehr, & McDougal, 1999; Thompson & Rebeschi, 1999). Unfortunately, many of the longitudinal and cross-sectional studies that have been completed have been inconclusive. However, the work from these studies has revealed some important findings and recommendations.

The studies completed to date have revealed the Watson-Glaser Critical Thinking Appraisal's (WGCTA) decreased reliability and validity. For example, Howell Adams, Stover and Whitlow (1999) completed a longitudinal study of nursing students using the WGCTA. The researchers found there was no significant increase in students' critical thinking abilities over the duration of their nursing education program. The authors also questioned the reliability and validity of the WGCTA (Howell Adams et al., 1999). In addition, Adams (1999) completed a review of previous studies that explored critical thinking instruments. Adam's work revealed inconsistent results based on the majority of studies that used the WGCTA. It is fair to say that some researchers reported a positive correlation using the WGCTA (Frye, Alfred, & Campbell, 1999). Overall, Adams (1999) concluded that the WGCTA is not an appropriate measure of critical thinking in nursing.

The CCTST and the CCTDI have been more consistent in measuring critical thinking in nursing contexts (McCarthy, Schuster, Zehr, & McDougal, 1999; Thompson & Rebeschi, 2001). In a study completed by Thompson and Rebeschi (2001), the CCTDI and the CCTST were used with students over the duration of a baccalaureate nursing program. The results showed a significant positive correlation between critical thinking and nursing education. In this study, students' total and sub-scale scores on the CCTST increased overall after the completion of a nursing education program. As well, the CCTDI results also increased for the same students. McCarthy, Schuster, Zehr, and McDougal (1999) also found an increase in critical thinking scores when they used the CCTST and the CCTDI to measure critical

thinking skills and dispositions in nursing students. There was also a significant relationship between the two instruments ($r = 0.24$, $p < .001$).

There are a number of recommendations from nurse researchers who call for increased use of qualitative techniques to measure critical thinking in nursing education. Howell Adams et al. (1999) recommended that due to the inconsistent results from the WGCTA, more qualitative investigations should be completed, in addition to using other quantitative tools. Maynard (1996) strongly recommended alternate methods to measure critical thinking, including qualitative techniques. Based on these recommendations, qualitative data gathering may capture different dimensions as to how students develop critical thinking abilities.

Nurse researchers call for the design and development of a nursing specific measurement instrument for critical thinking. Although some studies have found the CCTST and the CCTDI can be used successfully in nursing, other studies have not had similar success with these instruments. Leppa (1997) dropped the use of the CCTST from her study due to poor test performance and psychological burden on the sample participants. Creating a nursing specific tool may take into account the nature of nursing education and may be beneficial to explain how critical thinking develops (Angel et al., 2000). Videbeck (1997a) also supported the development of a discipline specific critical thinking measurement tool due to the increased use of these assessment tools in nursing. However, a clearer conceptualization of critical thinking in nursing needs to be developed before a discipline specific assessment tool for critical thinking can be created. Adams (1999) asserts that a more precise definition would provide boundaries and parameters around which one could measure what it

means to think critically. She also stated that it is possible to develop one definition to act as a guide for all nursing contexts.

Critical Thinking Abilities of Nurse Educators

Compared to the number of studies focusing on students' critical thinking abilities, the exploration of critical thinking in nurse educators is relatively limited. One of the reasons for the lack of such studies stems from the assumptions that nurse educators already promote the development of critical thinking in nursing students, and that nurse educators are themselves proficient in critical thinking (Hartley & Aukamp, 1994). However, these assumptions have seemingly gone unexamined to date.

One study that compared critical thinking abilities of nurse educators to that of nursing students revealed that nurse educators had a higher level of critical thinking ($t = 3.13$, $df = 94$, $p < .005$) compared to that of nursing students (Hartley & Aukamp, 1994). In this study, the WGCTA was utilized with participants. Recommendations from this study included further exploration of nurse educators' critical thinking abilities, and the continued comparison between nurse educator and nursing student populations.

Two additional studies used the CCTST and the CCTDI with two separate nurse educator groups. The first study by Coon (1997) investigated the critical thinking abilities of 120 nurse educators and compared the scores from the CCTST to the published student measurement range values. Coon (1997) found that nurse educators with a baccalaureate degree (BSN) exhibited higher scores on the CCTST compared to nurse educators having an associate degree (ASN). Both groups (BSN

and ADN) scored higher on the CCTST compared to students. In this study, nurse educators were found to have significantly higher critical thinking skills as measured by the CCTST.

The second study by Pendley (1997) investigated nurse educators' critical thinking abilities. Pendley's study used the CCTDI to measure the dispositions of nurse educators to think critically. This study found that doctoral prepared nurse educators scored higher on the subscales of open-mindedness and self-confidence compared to their baccalaureate colleagues. Overall it was found that nurse educators had a positive to strongly positive disposition towards critical thinking. Both studies by Pendley and Coon indicate that nurse educators score relatively high on the CCTST and the CCTDI, however both advocated further testing with these instruments.

Scheffer (2000) examined nurse educators' perspectives on their critical thinking through qualitative interviews. Specifically, she explored a) how nurse educators learned to think critically, b) how they shared their thinking with student populations, and c) what personal, organizational and leadership factors impacted their thinking. Key findings from this study included the lack of an agreed upon definition of critical thinking and a limited awareness by nurse educators regarding their abilities to describe and share their thinking abilities. This study also highlighted the importance that nurse educators place on their dispositions as an integral factor they perceived helped increase their critical thinking. Recommendations from this study called for the development of a conceptual model to increase nurse educators' critical thinking abilities as well as further provision of faculty development

opportunities to actively support the development of critical thinking in nurse educator populations.

Strategies to Facilitate Critical Thinking and Potential Barriers

Strategies to facilitate critical thinking and potential barriers related to critical thinking in adult and nursing education settings are highlighted in the literature. Both the field of adult education and the field of nursing offer effective strategies for educators to facilitate critical thinking in students. The importance of faculty development in the area of critical thinking is also an integral piece to this discussion. Magnussen Ironside (1999b) identified that teaching critical thinking in a rapidly changing health care system is a tremendous challenge for nurse educators. Strategies to facilitate critical thinking and the potential barriers that apply to nurse educators are discussed in the sections that follow.

Strategies to Facilitate Critical Thinking. Authors in adult education have outlined effective strategies to facilitate critical thinking. Brookfield (1987) offered specific suggestions to foster critical thought. He suggested: affirming the self worth of the student, listening attentively to critical thinkers, and showing support for the efforts demonstrated by those learning to increase their critical thinking (1987). Brookfield's ideas are less focused on nursing specific contexts; however they are an important starting point in any teaching learning interaction. Brookfield also believed that educators should role model critical thinking by being critical teachers (1987). Freire (1986, as cited in Brookfield, 1987) identified important characteristics of critical teachers, which include: competence, courage, risk taking, humility, and

political clarity. Brookfield (1987) built on this list by adding consistency, openness, specificity, and accessibility.

Classroom based courses can promote critical thinking through written and verbal strategies (Litecky, 1992). It is in the dialogue between faculty and students wherein there lies a potential opportunity to develop critical thinking. Specific methods or assignments that can emphasize the development of critical thinking include: panel presentations, assignment interviews, and seminar presentations (Litecky, 1992). It is important to note that Litecky does not possess a nursing background and that not all of the approaches mentioned may suit all nursing contexts. Due to the inclusion of both classroom and clinical settings within nursing curriculum, contextual alterations would need to be incorporated when using any of Litecky's suggested methods.

Another aspect of this exploration of strategies to foster critical thinking is to focus on the nurse educator and his or her surrounding context. On a broad level, Park Kyzer (1996) identified the need to explore organizational, management, and practitioner realms in order to improve one's own critical thinking. At the organizational level, administrative leaders must value the idea of developing their employees' critical thinking. In addition, leadership should actively practice critical thinking and support programs that enhance critical thinking abilities (Park Kyzer, 1996). Park Kyzer also stated that management should role model critical thinking and promote a risk free environment that praises efforts to think critically. At the practitioner level, a focus on one's attitudes, in addition to an individual's knowledge, experience, and skills, is imperative in fostering one's own critical thinking (Park

Kyzer, 1996). There are many suggestions for facilitating critical thinking in the literature. Although not all strategies can be utilized in every environment, the variety allows for potential application in a multitude of disciplines. Interestingly, collegial support is not mentioned in the literature as a strategy to foster one's critical thinking.

There are many strategies that can assist nurse educators to facilitate critical thinking in nursing student populations. Some of these specific strategies include promoting discussion amongst students, asking effective questions to prompt critical thinking, fostering students' interaction with resources, incorporating problem-based learning principles, and fostering positive learning environments (DeYoung, 2003). Clinical application and experience is also an important strategy to use when fostering critical thinking in nursing. In addition, developing creative pedagogies such as using a case study approach, implementing application assignments, and providing hands-on clinical practice can assist nurse educators to increase students' abilities to think critically (Magnussen Ironside, 1999b).

Barriers to Facilitate Critical Thinking. Unfortunately some of the above mentioned strategies may require smaller class sizes and increased class time. According to Magnussen Ironside (1999b), some strategies can be difficult to implement due to financially burdened programs and content full curriculums. Barriers that may inhibit nurse educators' abilities to foster critical thinking in students include their own lack of exposure to critical thinking as a nursing student, and the resultant potential presence of incompatible assumptions that can block the development of critical thinking in nursing students. Magnussen Ironside (1999b) reported the most common barriers for nurse educators related to facilitating critical

thinking are: a) student characteristics, b) time constraints, and c) the perceived need to cover content versus critical thinking.

Due to inconsistent results from studies evaluating the critical thinking abilities of nursing students, it is possible that barriers acting against the development of these skills may have inhibited nurse educators from successfully fostering critical thinking in nursing graduates. Shell (2001) found that nurse educators valued critical thinking in nursing curriculum and were confident in their teaching abilities. However, "participants expressed a need for more education on teaching for critical thinking" (p. 291).

Faculty Development. An important theme that arises when discussing strategies and barriers to facilitate critical thinking is the role of faculty development. Loving and Wilson (2000) identified the need to promote faculty development opportunities related to critical thinking for nurse educators in order to adapt previously content focused rituals into more student involved learning experiences. In their study, Loving and Wilson (2000) clarified faculty development opportunities "should be directed at helping faculty develop a range of teaching skills" (p. 74). Interestingly, this study does not see the need to explore nurse educators' dispositions towards critical thinking as a viable faculty development opportunity. Overall, implementing faculty development opportunities can be beneficial to nurse educators as an important piece in fostering their critical thinking and increasing their ability to limit the effects of potential barriers.

Overview

The literature surrounding critical thinking in nursing education is multi-faceted. It is evident that adult education principles and foundations are weaved throughout the complex mosaic of definitions, measurement approaches, facilitation methods, and potential barriers. Nursing faces many similar challenges as adult education when exploring critical thinking; however contextual influences have also highlighted the distinct nature of nursing. It is evident that critical thinking is a valued educational outcome however, more needs to be known about it. The ability of nurse educators to think critically is an area that has been largely overlooked despite their important role in nursing education. Further studies examining nurse educators' critical thinking abilities and dispositions, along with research that explores alternate strategies to facilitate critical thinking in nursing, have been recommended in the literature. This current study is one attempt to address this.

Chapter III: Methods and Design

This research study uses a descriptive, exploratory design by applying both quantitative and qualitative data gathering methods. According to Nieswadomy (2002), exploratory studies are used to define unclear phenomena. In addition, descriptive studies focus on "what is" (critical thinking) and what factors relate to the existence of the concept (Gall, Gall, & Borg, 2003). Researchers often employ quantitative designs that seek to establish cause-and-effect relationships. However, unless an accurate description of a concept is thoroughly generated, causal relationships cannot be established or explained (Gall, Gall, & Borg, 2003). The use of quantitative and qualitative methods allows for certain components of behavior (i.e., critical thinking in nurse educators) measured quantitatively using assessment instruments, to be compared with narrative accounts of the educators' experiences and thoughts collected using interviews (Gross Portney & Watkins, 2000).

Foss and Ellefsen (2002) argued that nursing research should parallel the complex and multidimensional nature of nursing knowledge. Both quantitative and qualitative methods were used to collect data in order to ensure that the complexity of nurse educators' critical thinking was effectively captured in this study. The quantitative approach was used to measure critical thinking objectively, while the qualitative interviews were employed to provide a deeper and more authentic picture of critical thinking. The combination of these two approaches has been criticized in the past for blurring the differing paradigmatic viewpoints from which each method originated. However, Foss and Ellefsen (2002) argued that both qualitative and quantitative premises are on a continuum of knowledge where each methodological

approach can be used to uncover different areas of knowledge that exist in a complex reality. Therefore, no single method or approach can be used to fully represent the depth and breadth of data surrounding critical thinking. Although Foss and Ellefsen (2002) have suggested future exploration of an equal balance of qualitative and quantitative methods, this study uses an equally valid approach that emphasizes a primarily quantitative design where qualitative methods are used to highlight and support the quantitative data.

Sampling and Ethical Considerations

Prior to sampling, ethics approvals were obtained from the University of Alberta and from the institution where the research being conducted. Access to the potential nurse educator participants was gained from the appropriate program chair. Participants for this study were selected from a baccalaureate nursing education program in Alberta. This program has approximately 25 full time nurse educators with varying backgrounds and years of experience. The selection of this site and its nurse educators was based on recommendations from others who have emphasized this site's receptiveness to participate in research activities. Another reason for selecting this site is the similarity of its program curriculum to the program in which I currently teach, allowing greater understanding of the context. Participants were selected using a convenience sampling technique for both the quantitative and qualitative data gathering methods. Email addresses were obtained and initial contact and invitation was made electronically (See Appendix A). A detailed explanation of the study, and the option to decline participation was forwarded with the electronic invitations. All full time faculty members teaching either theory or clinical-based

courses were invited to participate. The 11 nurse educators who agreed to participate were asked to select convenient times and dates to complete the CCTST and the CCTDI. Of the 11 nurse educators who completed the two instruments, six volunteered to be interviewed for one hour the following week. Informed consent was initially obtained from participants in writing and confirmed verbally during each stage of data collection (See Appendix B).

Methodology

Data for this study was collected using the California Critical Thinking Skills Test (CCTST), the California Critical Thinking Disposition Inventory (CCTDI), a demographic survey, and semi-structured interviews.

Instruments. In the first phase of this study, participants were asked to complete the CCTDI and the CCTST. These instruments were administered during four scheduled sessions to accommodate all participants. The total time required to complete these two instruments was approximately 1 ½ hours. Following completion of these two instruments, participants were asked to complete a demographic survey (See Appendix C). In addition to age, level of educational training, and years of experience, participants were asked to estimate their scores on the instruments.

The CCTDI and the CCTST were selected based on the work of nurse educators who have used them with nursing populations (Facione, 1995; Profetto-McGrath, 2003). The American Philosophical Association's definition of critical thinking (Facione, 1990) emphasized many of the components found in nursing definitions, such as the one developed by Scheffer and Rubenfeld (2000). The reliability and validity of the CCTDI and the CCTST reported in other studies

indicate these instruments are more accurate than other critical thinking tools previously used to measure critical thinking in nursing (Coon, 1997; Facione, Facione & Sanchez, 1994; Pendley, 1997; Thompson & Rebeschi, 1999). Another factor that positively contributed to the use of the CCTDI and the CCTST is the currency of these instruments. This study will also serve to verify how well their use measures what nurse educators believe to be critical thinking in a nursing education context.

The CCTDI consists of 75 generic statements, which are answered using a 6-point Likert scale and takes approximately 20 minutes to complete (Profetto-McGrath, 2003). Each statement corresponds to a subscale or disposition, which are: truth seeking, open-mindedness, analyticity, systematicity, self-confidence, inquisitiveness, and maturity. Based on the response, each item was scored from one to six; where one is strongly agree and six is strongly disagree. The raw totals for each subscale are then multiplied by ten and divided by the number of testing items included in that subscale. The scores can range from 5 to 60 for each subscale for a maximum total test score of 420. The final score represents the strength of the participant's disposition to think critically. A score over 350 represents a strong disposition whereas a score below 280 is representative of a weak disposition to think critically. Scores between 280 and 350 indicate a positive inclination for critical thinking (Facione, Facione, & Sanchez, 1994; Profetto-McGrath, 2003).

The CCTST consists of 34 multiple-choice questions related to generic situations and takes approximately 45 minutes to complete. Each question on the CCTST is worth one point for a minimum score of zero and a maximum score of 34. A total test score and five subscale scores can be derived for scoring the CCTST. The

five subscales included in the CCTST are: analysis, evaluation, inference, deductive reasoning, and inductive reasoning (Facione & Facione, 1994; Profetto-McGrath, 2003). Facione and Facione (1994b) report from a norm sample that the mean score for the CCTST is 15.89, with a minimum score of two and a maximum score of 29. Refer to Facione and Facione (1994b) for a more detailed description. Reliability and validity information pertaining to the CCTST and the CCTDI are included in the trustworthiness section of this chapter.

Interview. Six of the participants who completed the CCTDI and the CCTST volunteered to participate in a single one-hour interview, which was tape-recorded. The interviews followed a semi-standardized format where a set of pre-determined questions were asked of all participants (see Appendix D). Berg (1998) described a semi-standardized interview as the implementation of some pre-determined questions with the freedom of the participant to digress beyond the structure of the designed questions. This approach allowed me to ask the same questions of all participants while providing for the flexibility to use probes and prompts to ensure data was not limited to the information provided as answers to the pre-determined questions. As part of the interviewing technique, "critical incidents" (Brookfield, 1987) were used to prompt participants to identify events that were of particular significance to them. Participants were asked to describe an event that exemplified their definition, description, or demonstration of critical thinking. In this spirit, respondents were better able to provide an in-depth description of critical thinking when asked to share details of an event that highlighted this skill. Based on these incidents, participants were also better able to share their underlying assumptions related to critical thinking.

Although the use of critical incidents can produce detailed accounts of situations demonstrating critical thinking, because of the small sample number of participants in the interview phase and the potential identification of participants through the stories or experiences that they've shared, the actual accounts and stories shared by the participants are not included in this study to maintain confidentiality. Each interview was tape-recorded and transcribed by a transcriptionist. A one-page summary of the information received in the interview was created and sent to each participant to validate or confirm the accuracy of the interviewer's perceptions (member check). Guba (1981) supports the use of member checks, and described them as the "single most important action inquirers can take, for it goes to the heart of the credibility criterion" (p. 25). Four of six participants returned their respective members checks with few changes. Email reminders were sent to the two participants whose member checks were missing however, there was no return response despite repeated contact.

Pilot Testing. Although reliability and validity of the CCTDI and the CCTST has been well documented, establishing feasibility and credibility specific to this sample was important prior to data collection. Therefore, performing the pilot study allowed for me to uncover any concerns or unexpected issues in the research design (LoBiondo Wood & Haber, 2002). A pilot test was conducted with one nurse educator from a different nursing program than the one used in the study by administering the two instruments, the demographic survey, and the interview guide. A debriefing session was held after the pilot test. The participant of the pilot shared how it felt to complete the study and commented on the general logistics of the study.

The pilot participant also received personalized score information and an interview summary sheet similar to the study participants.

Data Analysis and Interpretation

Bogden and Knopp Biklen (2003) state data analysis is the method of organizing the data or evidence produced by a research study. There were multiple steps involved in this study's data analysis. First the demographic survey data was analyzed using descriptive statistics to define the characteristics of the sample. Second, the participants' responses from the CCTDI and the CCTST were hand scored and double-checked by an assistant who was not privy to participants' identities. These results were also summarized using frequency distribution; central tendency and variability; and correlation coefficients (Pearsons *r*). All statistical data from the CCTDI, CCTST, and the demographic survey was processed using SPSS version 9.5. Participants' ages, years of experience as a registered nurse, years of experience as a nurse educator, and levels of educational preparation were correlated with the respondents' scores from the critical thinking instruments using Pearsons r correlations. The reliability coefficients for the CCTST and the CCTDI were not calculated because of the small number. Third, the transcribed interviews were analyzed using content analysis to identify themes and emerging patterns. Bogden and Knopp Biklen (2003) stated that establishing "coding categories" while analyzing qualitative data is an important step when organizing your study's findings. Furthermore, Norwood (2000) identified an eclectic approach to qualitative data analysis that included deductive development of categories, inductive identification of themes, and subsequent integration of the themes and categories into links and

relationships. The summary of quantitative data and content analysis were further explored and analyzed as it pertained to each individual participant.

Trustworthiness

Overall, the objectivity of this study depends on the truth-value, applicability, consistency, and the neutrality of the factors and assessment methods utilized. These concepts can be linked to the 'naturalistic paradigm of inquiry' where research strives to uncover the multiple realities that exist surrounding critical thinking (Guba, 1981). Due to the combined approach (quantitative and qualitative), both the naturalistic and rationalistic paradigms are represented in this study. Guba asserts "there is no inherent reason why either paradigm cannot accommodate, and be contributed to, by either methodology" (p. 78). In addition, the motives, biases and interests of the researcher were thoroughly addressed.

Reliability and Dependability. The consistency of the data being produced relied on the quality of the quantitative instruments being utilized, as well as the structure and content of the interviews completed. Reliability of the two instruments has been demonstrated in previous studies (Coon, 1997; Facione, Facione & Sanchez, 1994; Pendley, 1997; Thompson & Rebeschi, 1999). The CCTST has internal consistency reliability, using the Kuder Richardson 20 method, of 0.68-0.70. The CCTDI has internal consistency reliability, using Cronbach alpha coefficients, of 0.91 overall. The subscale reliability coefficients of the CCTDI are: Truth-seeking, 0.70; Systematicity, 0.73; Inquisitiveness, 0.84; Open-mindedness, 0.64; Confidence, 0.82; Maturity, 0.70; and Analyticity, 0.84 (Facione & Facione, 1994, Facione, Facione & Sanchez, 1994; Profetto-McGrath, 2003, p. 572). In order to ensure the interviews

provided dependable information, an audit trail for external review was also established.

Validity, Credibility, and Transferability. The content validity of the instruments used in this study rests on the APA Delphi report and definition. Their construct validity is also directly related to the 1990 National Expert Consensus Statement on Critical Thinking (Facione, 1990). The CCTST has been positively linked to the Watson-Glaser Critical Thinking Appraisal (WGCTA) and the CCTDI has been found valid in previous studies (Facione, Facione & Sanchez, 1994).

The credibility of the interview data gathering method was ensured through member checks. The use of the CCTST and the CCTDI also served to provide additional exploration of each participant's critical thinking skills and dispositions, which enriched the data obtained from the interview process. Additionally, internal credibility relied on my ability to be conscientious and objective during data and evidence collection. My beliefs and assumptions have been openly discussed in this study. As well, the manner in which the instruments or interviews were conducted did not jeopardize the data collected from the participants. The two instruments were administered as per the directions provided in the test manuals and the interviews were carefully constructed and executed using facilitative techniques. Pilot testing served to ensure both data collection methods were appropriate and credible. Ideas and plans for the research were also shared with and approved by committee members during the research process.

The transferability of interview data was addressed through a clear and concise audit trail, which was established throughout the proposal and research

process. My beliefs and assumptions were also accurately and comprehensively included in this audit trail to ensure that the findings from the interview are inclusive of the influence that the research may have had on the process. Transferability was also established by ensuring a 'thick description' was obtained from each participant interview (Guba, 1981).

Limitations and Delimitations

This study is an exploration of critical thinking of a small group of nurse educators in one baccalaureate nursing program in Alberta. Due to the relatively new information that this study seeks to uncover, there are limitations to the scope and breadth of information that was produced. Limitations are "uncontrolled variables that may affect study results and limit the generalizability of the findings" (Nieswiadomy, 2002, p. 29) and should be openly acknowledged as much as possible, prior to data collection.

The limitations of this study included the use of interview and instruments as the only methods to collect data. Other methods were not used. The questions asked during the interviews were general in nature to capture themes of unknown factors related to critical thinking of nurse educators. To gather more contextually linked and rich data, critical incidents were requested from each nurse educator related to their definition and/or description of critical thinking. Unfortunately, I am not able to include the critical incidents obtained during the interviews due to confidentiality issues. This study also had a small sample size, with only 46% of the sampled faculty participating, which limits the generalizability of the resultant findings. As well,

purposive sampling was not possible due to constraints related to accessing potential participants.

The delimitations of this study include the exploration of only one nursing program in Alberta. In this nursing program, only 24 full time nurse educators were available to participate and only 11 volunteered to take part. As well, only six participants chose to take part in the interview portion of this study. These small sample numbers served to reasonably manage the amount of data collected, and to deal with access, financial, and time logistics. This study sought to uncover a broad spectrum of information at one point in time and thus may not capture information that may only be explored using a longitudinal approach.

Chapter IV: Findings and Discussion

Due to the large amounts of information collected in this study, this chapter contains the pertinent results and discusses the findings related to each research question. A discussion of the sample characteristics precedes the combined presentation and discussion of the findings.

Characteristics of the Sample

Program Description. The nurse educators in this study are employed in a four year baccalaureate nursing degree program that uses a Context Based Learning (CBL) curriculum. CBL parallels Problem Based Learning (PBL) and highlights the use of prior and new knowledge that is required by learners to work through problem-oriented scenarios reflecting real life situations (Magnussen, Isheda, & Itano, 2000). Students build on their existing knowledge by participating in discussions, asking and answering questions, engaging in peer teaching, and critiquing ideas and concepts (Biley & Smith, 1998 as cited in Magnussen et al., 2000). CBL is similar to PBL but emphasizes the exploration of all contextual elements related to the scenarios and offers a context to which knowledge and skills can be applied. The CBL curriculum is facilitated in tutorials (small group learning), laboratory sessions, clinical experiences, and support courses (i.e., physiology, psychology, anatomy).

The specific format of CBL tutorial courses for this program starts with the distribution of learning packages, which contain specific nursing related scenarios. The students are then guided through a process of a) determining what is important to know and learn, b) researching topics that pertain to the scenario in a self-directed manner, c) relaying information to other group members (peers), and d) finally

applying the learned information back to the scenario in discussion format. Providing a context around which to frame one's learning increases the likelihood that information, knowledge, "principles, and concepts will be transferred to a variety of nursing situations" (Wolff, 1998, p. A-6). Clinical courses also integrate CBL principles by fostering self-directed learning and clinical reasoning in an applied practice setting.

Critical thinking plays an important role in a CBL based curriculum. The development of critical thinking skills, abilities, and dispositions is imperative throughout the four years of the program, as well as in students' future nursing careers. By thinking critically, students are more likely to utilize effective decision making, provide patient specific quality care, and demonstrate clinical reasoning. The program in this study actively and openly supports the development of critical thinking in both students and faculty.

Demographic Data. Demographic data were gathered using the demographic survey, which was completed by participants after completion of the critical thinking instruments. The sample consisted of 11 full time nurse educators from a medium-sized baccalaureate nursing program in Alberta. In this sample of 11 nurse educators, the age range was 47to 59 ($X = 52.73$, $SD = 3.85$), and the average number of years that the participants have been teaching in a nursing program was 13.73 ($SD = 11.24$, range = 2 to 36 years). Participants reported a variety of educational backgrounds such as a Bachelor of Science in Nursing Degree, Doctoral preparation, Masters Degree in Nursing, Masters Degree in Education, and Masters Degree in Science. The most common level of education was a Master's Degree in Nursing ($n = 8$). The

number of years that participants have been registered nurses ranged from 7 to 36 years (X = 27.73, SD = 8.38). Participants were also asked to reflect on their perceived scores (above or below average) on the California Critical Thinking Disposition Inventory (CCTDI) and the California Critical Thinking Skills Test (CCTST). Seven participants reported below average self-ratings on the CCTST while seven participants reported above average self-ratings for the CCTDI. Data for this section was missing from one participant. Further discussion of nurse educators' perceived achievement on the CCTDI and the CCTST is presented later in this chapter.

The Role of Critical Thinking for Nurse Educators

Although this topic was not originally included as a specific interview question, it became apparent that in order to uncover how nurse educators felt about critical thinking in their practice, a question that explored a broader viewpoint on critical thinking was necessary to balance the microthemes identified in the responses by nurse educators to other interview questions. Nurse educators voiced that critical thinking was imperative to their practice to enhance their own lives and to facilitate students' future careers in the nursing profession. As a nurse educator, critical thinking is needed to keep up with more acute and changing practice methods. The nurse educator's ability to demonstrate, role model, and practice clinical reasoning and critical thinking is imperative to teaching students to think critically.

Nurse educators voiced that they frequently utilized critical thinking in their professional lives. Specifically, critical thinking was used in discussions with other colleagues, students, and program staff. Nurse educators indicated that the use of

critical thinking in the classroom setting has helped to transfer the onus of learning to the student, resulting in the instructor being deemed a facilitator versus a content expert. This study also identified that critical thinking has changed the focus of nursing education curriculum from nursing skills to a shared emphasis on the importance of thinking and skill completion in tandem. One nurse educator voiced that critical thinking has in return fostered self-direction and experiential learning in nursing students. The most frequent idea shared by nurse educators in this study was the need to ensure students learn and practice critical thinking in their future nursing practice. Because of the acuity level in hospital settings and changing health care environments, critical thinking is a mandatory survival skill for reflective and effective nursing practice. As well, critical thinking can be used to effectively deal with difficulties and frustrations that may occur in one's nursing career. Although some nurse educators felt an exceptionally high level of critical thinking wasn't a completely necessary skill for nurse educators to function effectively, it was stated, "one will not be an inspirational one (educator) without it".

Nurse Educators' Definition or Description of Critical Thinking

Nurse educators expressed a variety of components they believed to encompass critical thinking. Included in the responses was reference to a) a purposeful, and deeper problem solving process, b) an evidence based practice of ensuring adequate, applicable, and credible resources are sought and utilized to build a defensible argument, c) a methodical sorting through of information, d) a process of deconstruction and synthesis of ideas and information, and e) a reflection on knowledge, information, and on one's own thinking process. Nurse educators also

described critical thinking as various qualities or dispositions that were part of the critical thinking process. These qualities included being open-minded, analytical, systematic, creative, curious, honest, and reflective. Interestingly, all participating nurse educators voiced that they did not use one definition, but instead, found that a compilation of descriptors was more appropriate to define the borders of how critical thinking exists in their practice. As well, they voiced that to define critical thinking it was often easier to define what it was not, such as being negative or simple problem solving, than to fully explore the large borders surrounding this term.

All nurse educators agreed there was a difference, either real or assumed, between critical thinking and general thinking. Some of the responses to explain this difference included critical thinking as being more purposeful, deliberate, less likely to produce or utilize assumptions, more spiral or circular in nature (compared with linear patterns of general thought), and more apt to require the use of credible resources to substantiate ideas and conclusions. As well, many nurse educators expressed the importance of general knowledge as a solid foundation in the process of critical thinking.

Nurse educators identified various incidents when they felt they did and did not demonstrate critical thinking. The general nature of the incidents described included: a) decision-making processes while practicing and teaching in a clinical area, b) facilitating tutorial sessions with students and the concurrent use of critical thinking to form questions to guide student thinking, c) utilizing and reflecting on clinical situations that did not demonstrate critical thinking to further enhance student learning, d) dealing with difficult situations with colleagues and students, and e)

thinking privately or not in the moment that a situation occurred. Qualities that were identified to assist nurse educators in critical thinking were analyticity, curiosity, inquisitiveness, introspection, intuition, focus, creativity, admiration for facts and general knowledge, detail orientation, self-awareness of one's own weaknesses, introversion, modesty, confidence, persistence, effective listening skills, and reflection.

From these findings it was evident that nurse educators in this study prefer multiple descriptions of critical thinking rather than one definition. The statements they used to describe critical thinking were "deliberate thoughtfulness", "organizing your thoughts", "recognizing relatedness", and "sorting through the information methodically". As well, the nurse educators included dispositions or traits when describing critical thinking. Comparing the descriptions shared in this study with previous work found in the literature offers insight to how these nurse educators apply and utilize critical thinking in their teaching. These nurse educators' descriptions are congruent with the critical thinking work published by Facione (1990). Two additional attributes voiced by participants not found in Facione's (1990) definition of critical thinking were intuition and creativity. Interestingly, Scheffer and Rubenfeld (2000) uncovered that nurses mentioned these attributes in their study as well. Although Facione's definition does not elaborate on the intricate cognitive processes involved in critical thinking, participants were able to describe in more detail what critical thinking resembled in their environment. It was interesting that participants were desirous to describe what critical thinking was not, such as being critical, negative, or using simple problem solving to work through a clearly defined

problem. Kurfiss (1988) believed critical thinking utilizes a deeper and more complex problem solving process that is focused on ill-structured problems. Nurse educators' supported this statement by verbalizing that critical thinking was "deeper problem solving" that looked at various facets of complex problems. As well, although problem solving is a component of critical thinking, nurse educators and McPeck (1981) both stated it was a small component of the entire process.

The numbers of descriptions of critical thinking reported in this study are reflected in the variety of different situations mentioned when participants were asked to reflect on and describe an incident that demonstrated critical thinking. For these nurse educators, critical thinking has place (relevance) and space (meaning) in situations ranging from everyday life outside the work environment to encounters with students, colleagues, and program staff. Also included in these above situations were teaching experiences with students in both classroom and clinical settings. Some authors, such as Garrison (1991) agree there is no one definition of critical thinking that suites all situations. The findings of this study affirm this premise given the varied situations that are encountered by nurse educators.

Nurse Educators' Critical Thinking Skills and Dispositions

The first assessment tool completed by the 11 participants was the CCTDI. The overall mean total score for all participants was 331.55 (SD = 34.45) with scores ranging from 258 to 380. The mean from each subscale are listed in Table 1. As previously indicated, a score below 40 in any disposition reflects an individual's weakness. A score of 50 and above represents a higher disposition to engage in critical thinking. Scores 40 to 49 represent a positive inclination in a specific

disposition. As evidenced in Table 1, there is a wide range in sub-scale scores especially in the analyticity sub-scale (33 to 60) and the systematicity sub-scale (28 to 50).

Table 1

*Nurse Educators' CCTDI Sub-Scale Scores**

Sub-Scale	Mean	Range	Standard Deviation
Truth-Seeking	43.82	39 – 53	3.71
Open-mindedness	49.82	39 – 58	5.46
Analyticity	45.00	33 – 60	8.49
Systematicity	43.45	28 – 50	6.47
Confidence	48.91	37 – 57	6.73
Inquisitiveness	53.91	46 – 60	4.21
Maturity	46.82	35 – 54	5.02

* Minimum achievable score = 0
Maximum achievable score = 60

The nurse educators' overall mean total score for the CCTDI was 331.55, demonstrating a moderately strong disposition to think critically. Even though the group mean result was not above 350, 27% of participants (n = 11) did achieve a total score higher than 350, indicating an overall strong disposition to think critically. All nurse educators' sub-scale mean scores were above 40 indicating that the nurse educators displayed a positive inclination in all sub-scales; however mean scores for systematicity (43.45) and truth-seeking (43.82) were the lowest.

The lower systematicity and truth-seeking subscale mean scores warrant examination. This study found that nurse educators' sub-scale mean scores in truth-

seeking and systematicity are higher compared to other studies; however these sub-scales have characteristically been found to be ranked lower compared to other sub-scale scores. As reported by Profetto-McGrath, Hesketh, Lang, and Estabrooks (2003), practicing nurses scored below 40 in the sub-scales of truth-seeking, systematicity, critical thinking self-confidence, and analyticity. In the study by Profetto-McGrath et al. (2003), systematicity, truth-seeking, analyticity, and maturity displayed the lower mean scores respectively. As reported by Profetto-McGrath et al., the reasons for the lower truth-seeking and systematicity scores could be attributed to the structure of the environment in which the participants developed critical thinking. Didactic nursing instruction, which existed prior to the newer context-based learning approach and continues to exist in some programs, or the structure of the work environment where critical thinking is further developed, could be possible explanations. Profetto-McGrath (2003) and Colucciello (1997, as cited in Profetto McGrath et al., 2003) also indicate the possibility that didactic teaching methodology may contribute to lower truth-seeking disposition scores in baccalaureate nursing students. Profetto-McGrath et al. (2003) also assert that lower scores in the truth-seeking sub-scale could be attributed to the nature of the items that are used to measure this particular disposition. When the CCTDI was correlated using Pearsons r in this study, all sub-scales correlated to each other except the truth-seeking sub-scale. Truth-seeking did not correlate to the other subscales or to the total score. Table 2 displays the correlations for the CCTDI participant scores (n = 11).

Table 2

Correlations from the CCTDI

	CCTDI Total Score	T	O	A	S	SC	I	M
CCTDI Total Score	-	NS	.914**	.867**	.915**	.862**	.929**	.885**
T		-	NS	NS	NS	NS	NS	NS
O			-	.812**	.736**	.803**	.840**	.795**
A				-	.712*	.611	.712*	.759**
S					-	.715*	.898**	.921**
SC						-	.819**	.622*
I							-	.871**
M								-

Legend:
T = truth-seeking
O = open-mindedness
A = analyticity
S = systematicity
SC = self-confidence
I = inquisitiveness
M = maturity
NS – not statistically significant
* Correlation is significant at the 0.05 level (two-tailed)
** Correlation is significant at the 0.01 level (two-tailed)

Although this current study did have a small sample size (n = 11), the absence of a correlation between the truth-seeking sub-scale and other aspects of the tool warrants further use and investigation of this instrument with other nursing populations.

In this study, inquisitiveness had the highest mean sub-scale score (53.91), which reflects a high disposition for the sample group. When all scores for the 11 nurse educators were reviewed, each of their scores for this sub-scale were 46 and above. Only 2 participants (18%) scored below 50. During the interviews participants reflected a strong value for inquisitiveness as an integral part of their experiences with critical thinking. Profetto-McGrath et al. (2003) also found that the sample of nurses in their study scored high on the inquisitiveness sub-scale.

Nurse educators' raw scores on the California Critical Thinking Skills Test (CCTST), were between 17 and 25 with a mean of 21.18 (mean percentile = 87.46, median = 20, mode = 20). Each of the participant's total scores exceeded the standardized mean of 15.89, as established and reported by Facione (1994). Each of the sub-scale's mean, standard deviation, percentile mean scores, and the range of scores are summarized in Table 3.

Table 3

*Nurse Educators' CCTST Sub-Scale Scores**

CCTST Sub-Scale	Mean Score (Mean Percentile)	Standard Deviation	Range
Analysis	5.73 (82.18%)	1.27	3 – 7
Evaluation	8.64 (89%)	1.91	6 – 12
Inference	6.82 (68.36%)	1.08	5 – 9
Deductive Reasoning	9.55 (76%)	2.02	6 – 12
Inductive Reasoning	9.55 (89.64%)	1.21	7 – 11

* Minimum achievable score = 0 for each sub-scale
Maximum achievable score = Analysis = 9, Evaluation = 14, Inference = 11, Deductive Reasoning = 16, Inductive Reasoning = 14

The lowest corresponding mean percentile score corresponded to the inference sub-scale and the highest sub-scale percentile was inductive reasoning. Each of the sub-scales had relatively similar ranges.

The mean score for the CCTST in this study was 21.18 (range 17 to25) with an assigned approximate percentile of 89 to 90. Norms published by Facione (1994) for this tool are mean 15.89, range 2 to 29, and median 16. All results from this study exceeded the norms published by Facione (1994); however it must be noted that the sample in this study is comprised of nurse educators compared to the norms in Facione's report, which were established using undergraduate college students. Based on the scores for the specific sub-scales, nurse educators in this study scored lowest on the inference sub-scale. The process of inference is defined by Facione (1994) as the ability "to identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses, to consider relevant information and to educe the consequences flowing from the data…" (p. 5). Inference is the weighing of evidence, imagining of alternatives, and the drawing of conclusions. It is unclear what specific factors may have caused this lower result in this study.

Gordon (2000) found that nurse-scholars linked the definition of critical thinking and the nursing process components of assessment, diagnosis, planning, intervention, and evaluation. Based on Gordon's work it is possible that higher mean scores of inductive reasoning, evaluation, and analysis may be congruent with the use of the nursing process steps; whereas the skills of inference and deductive reasoning may not be emphasized as heavily in the nursing process. Perhaps the use of the nursing process does not support the skills of inference and deductive reasoning as

much as it does inductive reasoning, evaluation, and analysis. Again, replication of this study with a larger sample size is necessary to further investigate this proposition.

All scores achieved by the nurse educators on the CCTST were compared to each other using Pearsons r correlations. Based on the results of these correlations there are a few significant relationships between the sub-scales and the total assessment tool scores. The significant correlations included a positive relationship between the total scores and the sub-scale scores of analysis ($r = .619$, $p<0.05$, 2-tailed), evaluation ($r = .690$, $p<0.05$, 2 -tailed), and deductive reasoning ($r = .717$, $p<0.05$, 2-tailed). With the exception of deductive reasoning, these correlations may further support the stronger prevalence of these skills in nursing or nurse educator populations, but would have to be verified through further investigation.

One of the questions from the demographic survey, which was completed by the nurse educators after the two assessment tools, asked them to rate their perceived achievement on the CCTDI and the CCTST either as above or below average. Although average was not defined for the participants, interesting conclusions could be inferred from the responses. Table 4 displays the perceived rating each participant selected compared with both the norm and sample averages.

Table 4

Nurse Educators' Perceived Scores on the CCTDI and the CCTST

Participants	Nurse Educator Self-Rating on the CCTDI	Nurse Educator Self-Rating on the CCTST		Comparison to Target Score on the CCTDI (280)	Comparison to Average Total Score for the CCTST (15.89)*		Comparison to Sample Average CCTDI (331.55)	Comparison to Sample Average CCTST (21.18)
1	AA	BA		AA	AA		AA	BA
2	**	**		AA	AA		AA	AA
3	AA	BA		AA	AA		BA	AA
4	BA	BA		BA	AA		BA	BA
5	BA	BA		AA	AA		AA	AA
6	AA	AA		AA	AA		BA	BA
7	BA	BA		AA	AA		AA	BA
8	AA	BA		AA	AA		BA	AA
9	AA	AA		AA	AA		BA	BA
10	AA	BA		AA	AA		AA	BA
11	AA	AA		AA	AA		AA	BA

This table outlines nurse educators' perceived scores on the CCTST and the CCTDI as compared to published norms and calculated sample means.

AA = Above Average BA = Below Average

* As published by Facione (1994) ** missing data

Based on this data, it is evident that there is no pattern or significant link between the perceived scores on the CCTDI and the CCTST and the nurse educators' results on these assessment tools. For example, only three of the ten nurse educators correctly perceived their results compared to the group mean. Three different participants were able to correctly assess themselves according to target norms established for these assessment tools. Overall, four of ten nurse educators were not able to conclusively match their results to either the published or sample averages.

Given these results, one could conclude two possible explanations. The first explanation is that there is a lack of self-awareness among the participants about their critical thinking dispositions or skills. This may be due to possible factors such as a

lack of exposure to critical thinking assessment techniques or a lack of clarity regarding the definition of critical thinking. The second plausible explanation is a possible design flaw may have occurred when asking the participants to rate their achievement on these tools. Although the demographic survey containing these questions was administered after completion of the instruments, the wording of the questions could have been clearer.

Critical Thinking Strategies Used by Nurse Educators

Nurse educators in this study reported the use of many strategies in their teaching to facilitate critical thinking. Specific strategies or approaches used by participants in their teaching practice are organized based on: a) strategies specifically used in the classroom setting; b) strategies used in the clinical area; and c) strategies useful in both the classroom and clinical setting. Table 5 lists the strategies.

Table 5

Strategies that Nurse Educators Utilize in Classroom and Clinical Settings to Facilitate Critical Thinking

Tutorial/Classroom Strategies	Clinical Strategies	Strategies that can be used in both Classroom and Clinical Settings
• questioning techniques such as Socratic questioning • asking students to actively analyze resources utilized to gather information • promotion of more in-depth discussions that actively foster analysis of situations presented during tutorial classes • engaging students in self-knowledge through self-assessment of personality and learning styles • creating and applying frameworks which students can use to cluster and organize their ideas	• practical application and nursing care during clinical courses such as questioning students about their planned patient care and having discussions about what is occurring with specific patients and the related rationale for nursing care • promotion and use of application assignments (i.e. care plans) in the clinical area	• creating a positive and open environment • examining culture and the impact various cultures have on delivering nursing care • role modeling all aspects of critical thinking including deconstruction of ideas and the resultant synthesis and reflection • giving appropriate direction when needed such as providing answers when students are frustrated and unable to continue on with their own learning and thinking. • creating and following standards of critical thinking. This includes role modeling exemplary critical thinking for students and utilizing established standards such as clarity of thought • fostering critical thinking dispositions such as open-mindedness by role modeling

This research question was posed to learn about teaching strategies used by nurse educators and compare them to approaches or strategies identified in the literature. The various strategies shared by participants are found in published literature, demonstrating awareness by nurse educators as to how critical thinking can be incorporated and facilitated in the classroom or clinical setting. DeYoung (2003) describes six categories of strategies to enhance critical thinking. These categories include: discussion, asking effective questions, text interaction, the use of PBL,

concept mapping, creation of a positive environment, and other miscellaneous strategies. It is evident that the strategies reported collectively by nurse educators in this study reflect all six categories mentioned by DeYoung (2003).

One strategy shared by nurse educators that is not explored by DeYoung (2003) is role modeling of both the dispositions and skills associated with critical thinking in nursing. Brookfield (1987) explored this concept in more depth by asserting that the observation of role models "helps us to imagine, define, and practice the kinds of behaviors in our own lives…" (p. 85). Furthermore, Brookfield (1987) believed that an educator can model reflective thought during the use of certain teaching strategies and can also demonstrate qualities that will improve the effectiveness of role modeling such as: clarity, consistency, openness, communicativeness, specificity and accessibility. Brookfield cautioned that although role modeling can be effective in certain situations, it cannot be prescriptive and must be tailored to the specific context. Ford and Profetto-McGrath (1994), Loving and Wilson (2000), and Scheffer (2000) also mention the importance of nurse educators role modeling critical thinking in order to facilitate students' movement through a process of knowing or thinking, to doing or acting.

According to the data from this study, the strategies used by nurse educators varied according to the type of courses they predominantly teach. This research question sought to uncover the strategies being utilized however, further in-depth exploration of strategies used in nursing education to promote critical thinking would be beneficial to gain more insight into exactly what is being utilized and what is being deemed effective teaching techniques in other nursing education populations.

Positive and Negative Factors that Impact Nurse Educators' Critical Thinking

Nurse educators in this study listed many factors that assist their critical thinking and its development. These ideas are organized into categories which pertain to nurse educators and their environment. The ideas that are part of nurse educators' internal characteristics were described as open-mindedness, hydration or physical well-being, confidence, trust, education combined with experience, inquisitiveness, passion about the subject matter, as well as reading, thinking, and writing activities. Positive influences related to the nurse educators' environment included freedom to think and make mistakes, collegial support, effective role models, established mentorships, communication within a program about critical thinking, the program's commitment to critical thinking, faculty development opportunities (i.e., workshops, guest experts), program committee work related to curriculum development, and opportunities to discuss critical thinking with colleagues.

Similar to the positive factors mentioned, the negative factors identified can also be categorized as those concepts that pertain to nurse educators and those elements that originate from the environment. Table 6 lists the factors voiced by the participants.

Table 6

Factors that Negatively Influence Nurse Educators' Development of Critical Thinking

Factors Related to the Individual Nurse Educators	Factors Related to the Nurse Educator's Environment
- Emotional attachment to issues - Making assumptions - Lacking openness to other points of view - Physical and emotional stress - Lack of energy - Decreased capability	- Negative student behaviors - Not having access to needed information - Judgmental environment and people - Lack of support for critical thinking in the work environment - Lack of freedom to implement curriculum - Strict teaching guidelines and time constraints - Intensive workload

Nurse educators felt they had to be physically and emotionally ready and able to think critically. From the interview data, nurse educators shared that passion and interest for critical thinking and nursing knowledge; clinical experience in the nursing field; physical health and energy; emotional readiness to engage in critical thinking; and certain dispositions related to critical thinking would have to be present in order for critical thinking abilities to surface or develop. Nurse educators felt that a lack of these factors may inhibit critical thinking. Many nurse educators also shared that making assumptions regarding knowledge or situations could inhibit the development of critical thinking. One participant stated "as soon as you make an assumption you are lost". In this sense, assumptions can act as blinders preventing one from seeing and thinking objectively about a situation or piece of knowledge that one is thinking

about (Park Kyzer, 1996). "Examining one's assumptions is an integral part of learning to think critically" (Park Kyzer, 1996, p. 69).

In the external environment, factors shared by these respondents that positively influenced one's ability to critically think included the nursing program where nurse educators work and the individuals that make up the faculty group. Factors voiced by nurse educators that promoted critical thinking included a positive general milieu and the presence of a program philosophy that included critical thinking in the nursing curriculum. In this study, nurse educators voiced that in their program, the development, inclusion, and use of critical thinking in various courses is openly supported. Nurse educators in this study were also willing and often discussed critical thinking with their colleagues related to curriculum experiences they facilitated for the students.

Given the findings of this study, I believe that the supportive milieu found within this nursing program and the nurse educators skilled and disposed nature to critically think are essential in the development of critical thinking in this nursing curriculum. From the findings of this study it was also evident that this program offered faculty development opportunities and incentives in the area of critical thinking. Park Kyzer (1996) supports this idea and states faculty development experiences that do more than meet minimal faculty needs is key to increasing critical thinking abilities. For example, Park Kyzer includes mentoring and cross discipline groups as two examples of effective faculty development strategies to increase the critical thinking abilities of faculty. In this study nurse educators did report the use of mentoring, workshops, and seminars to facilitate development of their critical

thinking. As well, the use of critical thinking measurement tools has been mentioned in the literature to help individuals to become self-aware and more apt to increase one's critical thinking abilities when they are administered in a non-threatening manner (Park Kyzer, 1996). Nurse educators in this study verbalized a positive inclination to using assessment tools to assist further development of their critical thinking dispositions and skills.

Factors that negatively impact nurse educators' critical thinking, and those that should be avoided include restrictive implementation guidelines and prescriptive teaching requirements. Intensive workloads also inhibit critical thinking by shifting the focus of teaching from desired critical thinking strategies, which promote risk taking and the time and freedom to make mistakes, to a strict content delivery mode that does not allow time for nurse educators to try new ideas and strategies. As well, nurse educators mentioned the potentially detrimental influence negative individuals had on their critical thinking. Examples of negative individuals included other faculty members who were perceived to be unreceptive to critical thinking and students that displayed both a lack of receptivity to critical thinking and an overall negative outlook on the educational process. In this sense, nurse educators felt faculty development opportunities, which focused on addressing and developing strategies to counteract negative factors or explored how to deal effectively with individuals who inhibit critical thinking, would also be helpful.

It is interesting to note that in this study nurse educators voiced and demonstrated interconnectedness between their own critical thinking and the critical thinking of students. Nurse educators voiced that students played a role in fostering

their critical thinking both positively and negatively. For example, one participant shared that "it depends on your group (of students). If you get a couple of people in your group that are fairly loud and take over and just sometimes say what comes into their heads, it's a lot different than if you've got a group that wants to do research, work, and really learn". Another nurse educator voiced that students' blaming type behaviors and lack of emotional readiness affects the students' and the educators' critical thinking. It is evident that the critical thinking of nurse educators is integrally linked to the critical thinking of nursing students. In order for the nurse educator to demonstrate critical thinking in a learning experience, the student must also engage in the process. This may mean that critical thinking is a process somewhat reliant on the social realm for it to be fully recognized. In this study, it was not possible to fully define the borders of the connection between nurse educators' and student's critical thinking. However, further exploration of this interconnectedness would provide a clearer picture of this relationship.

The Relationship Between Sample Characteristics and Critical Thinking Scores

The participants' ages, levels of educational qualification, years of experience as a registered nurse (RN), and years of experience as a nurse educator, were correlated with the scores achieved on the CCTST and the CCTDI (See Table 7).

Table 7

Correlations Between Nurse Educators' Demographic Variables and Scores from the CCTDI and the CCTST

Variables	Age	Years of Experience as a Nurse Educator	Years of Experience as a Registered Nurse	Highest Educational Qualification
CCTDI Total Score	NS	NS	.807**	NS
Truth-seeking	NS	NS	NS	NS
Open-mindedness	NS	NS	.760**	NS
Analyticity	NS	NS	.771**	NS
Systematicity	NS	NS	.755**	NS
Self-confidence	NS	NS	NS	NS
Inquisitiveness	NS	NS	.632*	NS
Maturity	NS	NS	.810**	NS
CCTST Total Score	NS	NS	NS	NS
Analysis	NS	NS	NS	NS
Evaluation	NS	NS	NS	NS
Inference	NS	NS	NS	NS
Deductive Reasoning	NS	NS	NS	-.665*
Inductive Reasoning	NS	NS	.763**	NS

*Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

As identified in this table, there is no statistical significance between age or years of experience as a nurse educator and the scores achieved on the CCTDI and the CCSTI. This may be due in part to the limited range of participants' ages (range 47 to 59). Despite the range in the years participants worked as nurse educators (2 to 36), there is no significant correlation. In other studies, demographic data were not significantly correlated with the CCTST scores (Coon, 1997). Profetto-McGrath, et

al. (2003) found that nurses' age and years of nursing experience was negatively correlated with CCTDI scores (r=-.23 and r=-.15 respectively).

Overall, the significant results in this study included a positive correlation between years of experience as a registered nurse and the CCTDI total score. As well, years of experience as a registered nurse also positively correlated with the sub-scales of open-mindedness, analyticity, systematicity, and inquisitiveness. For these nurse educators, the more years of experience teaching nursing was related to a more heightened ability to thinking critically.

Another significant finding was the positive correlation between the CCTST sub-scale score of inductive reasoning and the years of experience as a registered nurse. Another finding which may shed some light on this correlation is the negative relationship between years of experience as a nurse educator and the CCTST skill of deductive reasoning. Because this study included a small sample of nurse educators, limited factors could be attributed to these findings.

The Relationship Between Critical Thinking Scores and How Nurse Educators Define or Describe Critical Thinking

I was interested to see whether there was a significant relationship between educators' definitions or descriptions of critical thinking and their respective scores on the CCTDI and the CCTST. Based on the data obtained it was not possible to make any concrete conclusions between these variables.

All six nurse educators who participated in the interviews scored relatively high on the CCTDI sub-scale of inquisitiveness (48 to 60) and voiced a strong interest in participating in both the quantitative and qualitative portions of this study.

Inquisitiveness reflects curiosity, enthusiasm, and eagerness to attain knowledge for the sake of learning. All six participants described critical thinking attributes rather than providing a specific definition and included various definitions of problem solving as part of its description. This may indicate that for the nurse educators who participated in the interviews, inquisitiveness could be related to a desire to solve problems using critical thinking.

Examination of the other CCTDI sub-scales provides a clearer picture of possible links to the definition or description of critical thinking provided by nurse educators in this study. The sample's second lowest score was achieved on the truth-seeking sub-scale (X= 43.82, SD = 3.71). Truth-seeking is defined as an individual's desire to seek the best knowledge despite the potential that new knowledge may undermine one's previously held beliefs, assumptions and values (Facione & Facione, 1992; May, Edell, Butell, Doughty, & Langford, 1999, as cited in Profetto-McGrath, et al., 2003). Based on the interview data collected, there are few descriptions of critical thinking that included truth-seeking. Although participants did mention that they had an "admiration for the facts" and did agree that "finding alternative answers" was included in critical thinking, the only mention of finding the best knowledge was evident when one participant stated that in evaluating critical thinking in students, one would assess whether they are able to "find the best answer". In this interview, the participant stated that in order to find the best answer, the student and nurse educator had to be analytical, intentional, systematic and disciplined. It appeared from this comment that some skills from the CCTST are similar to how this nurse educator defined truth-seeking. The truth-seeking disposition may not be well developed in the

nursing population, or perhaps this assessment tool may not accurately capture what truth-seeking resembles for nurse educators.

The lowest sub-scale score from the CCTDI for this study was systematicity ($X = 43.45$, $SD = 6.47$). Systematicity is defined as valuing focus and diligence when engaging in a complex problem solving process. Examination of the interview data reveals that nurse educators included this disposition when describing critical thinking. More specifically, statements used by nurse educators to describe critical thinking include "having a certain methodology…if it's a systematic approach that helps", and "some qualities that come out when we're talking about critical thinking include systematicity…". Although this specific disposition is mentioned in descriptions of critical thinking provided by the participants, possible explanations for a lower mean score on this subscale could reflect nurse educators' knowledge of these qualities and their ability to verbalize their importance. However, having the knowledge of demonstrating systematicity does not guarantee that one is able to fully demonstrate systematicity related to critical thinking. Barriers within the environment, such as decreased time and limited faculty development opportunities specifically aimed at this sub-skill, may affect nurse educators' ability to demonstrate systematicity.

The means for the other sub-skills of open-mindedness, analyticity, critical thinking self-confidence, and maturity ranged from 45 to 49.82. There were no obvious links between the interview data and nurse educators' scores on the CCTDI and the CCTST.

When the CCTST scores were considered together with the descriptions of critical thinking provided by nurse educators, a few connections were evident. One interesting observation was with those who scored lower on the CCTST because they verbalized their descriptions of critical thinking based on what it is not instead of what it entailed. The task of defining critical thinking is a complex one and requires critical thinking skills to do so. It may be necessary to have higher critical thinking skills to cultivate or define it.

The sub-scales mean percentiles which were high in this sample included inductive reasoning, evaluation, and analysis. Deductive reasoning and inference rounded out the bottom two sub-scale scores. Inductive reasoning is defined as the taking of observations and the making and reconstruction of hypotheses for the basis of building theory. During the interviews, the nurse educators who scored higher on this particular sub-scale described critical thinking as a process of deconstruction, synthesis, and reflection. Deconstruction, synthesis, and reflection can be linked to the nursing process components of assessment, diagnosis, planning, intervention, and evaluation. Induction is a skill nurses frequently use in practice. The practice environment may be the facilitating factor assisting these nurse educators in developing this critical thinking sub-scale.

Although limited links are obvious between the descriptions of critical thinking voiced by the sample nurse educators and their respective scores on the CCTDI an the CCTST, important potential exists for future research endeavors.

The Relationship Between Nurse Educators' Critical Thinking Scores and Methodologies

This research question was explored to uncover why nurse educators choose strategies they do when teaching student nurses to think critically. Nurse educators scored moderately high on both the CCTDI and the CCTST. These scores can be considered together with the strategies nurse educators use in learning interactions to facilitate critical thinking. The nurse educators reported the use of some similar strategies during the interviews. The three most common strategies were: a) the use of questioning techniques to further group understanding through discussions, b) role modeling of both critical thinking skills and dispositions, and c) the creation of a safe, positive, and open environment in which to learn critical thinking. These strategies were most frequently shared by the nurse educators who achieved higher scores on the CCTDI and the CCTST. The CCTDI sub-scales important for these strategies are inquisitiveness, open-mindedness, and confidence, which were found to be the highest scores amongst nurse educators. The top three CCTST sub-scales of inductive reasoning, evaluation, and analysis are also key. However, another possible explanation as to why these strategies are used lies in faculty development sessions where nurse educators are exposed to at least one of the afore mentioned strategies.

Differences in individual responses point to less frequently mentioned strategies, which deserve recognition. The strategies mentioned by the minority of nurse educators in this study included the use of self-knowledge assessment to learn about one's personality and learning style; examination of culture as a separate activity in order to learn how culture affects nursing care; and the skilled use of direction and guidance as a learning strategy to assist student to learn critical thinking.

From the results of this study, one might infer the strategies nurse educators utilize to facilitate critical thinking could be mediated by their critical thinking dispositions and abilities. Although no solid connections are evident from the data obtained from this study, the various strategies mentioned by nurse educators, forms a foundation from which more studies can be completed.

Chapter V: Summary, Findings, Implications, Recommendations, and Conclusion

Summary

This research endeavor is a descriptive, exploratory study that aimed to uncover the critical thinking of nurse educators. This research study also sought to uncover any possible connections between certain variables and the scores on the California Critical Thinking Disposition Inventory (CCTDI) and the California Critical Thinking Skills Test (CCTST). The multitude of variables examined and correlated included nurse educators' description or definition of critical thinking, age, years of experience (both as a nurse educator and a registered nurse), teaching strategies, and positive and negative factors that have influenced their critical thinking skills and dispositions.

This study utilized both quantitative and qualitative data gathering techniques with a sample of 11 full-time nurse educators from a baccalaureate nursing program in Alberta. Nurse educators were invited to participate regardless of age, educational achievement, or years of experience. First, the participants were invited to complete the CCTDI and the CCTST. After the completion of these instruments, a demographic survey was administered to identify various characteristics of the sample. One-hour interviews were then completed with six volunteers from the group of 11. During the interviews, definitions or descriptions of critical thinking; positive and negative factors impacting critical thinking abilities and development; and teaching strategies used to facilitate critical thinking in a learning environment were explored.

The data were organized and analyzed using both statistical and thematic methods. Relationships between the variables were then explored using Pearsons r correlations. Interview data were verified by offering each nurse educator a one-page summary of the interview to which they could make changes, comments, or ask questions. Themes emerging from the interview data were then analyzed together with quantitative scores achieved on the CCTDI and the CCTST.

Findings

Results from this study indicate that nurse educators have a moderately high inclination to think critically and demonstrate moderately high abilities or skills to think critically. As well, nurse educators prefer to offer various descriptions of critical thinking instead of providing one all-encompassing definition. There are various strategies that nurse educators use as part of their teaching to facilitate the critical thinking of students. The most common strategies shared by nurse educators in this study are: a) the use of questioning techniques, b) role modeling of critical thinking skills and dispositions, and c) the creation of a safe, positive, and open environment. Factors that positively and negatively affect the use and development of nurse educators' critical thinking ranged from personal factors, to those influences found in the work environment. When comparing the variety of variables explored in this study, limited connections were established. Due to a small sample, results from this study are not generalizable to other nurse educator populations. From this study, support for faculty development activities related to critical thinking and further research exploring nurse educators' critical thinking are recommended.

Implications

This study has implications for faculty development activities and for the field of critical thinking.

Faculty Development Activities. This study highlights potential faculty development opportunities that could increase the critical thinking abilities and dispositions of nurse educators. Although critical thinking is a term used frequently in nursing education, the lack of consensus in defining this term, and the various descriptions mentioned in this study, suggest further faculty development opportunities would be valuable to nurse educators. More specifically, the history of critical thinking, the various definitions, and the exploration of the multitude of literature related to critical thinking should be included as faculty development topics. In addition, the use of assessment instruments to measure nurse educators' critical thinking skills and dispositions should be implemented to increase self-evaluation and self-awareness in nurse educator populations. Seminars and in-services related to the various facets of critical thinking could also increase nurse educators development of specific skills and abilities. For example, sessions examining the use of questioning techniques and the importance of role modeling should be implemented. As well, mentoring, small group activities for students, and faculty peer support discussion groups are topics to be explored. These implications have significance for both nurse educators and leadership teams responsible for delivering nursing education programs. Faculty development opportunities are a strong component of ensuring nurse educators have the opportunity to develop and maintain their critical thinking

skills and dispositions in order to effectively facilitate critical thinking in nursing students.

The Field of Critical Thinking. This study has implications for the general field of critical thinking. The use of the CCTST and the CCTDI in this study has furthered the need to explore the creation of a nursing specific critical thinking measurement tool. Although the results from this study suggest that the CCTDI and the CCTST can measure critical thinking in nurse educators, previously published averages and studies have mainly been completed by undergraduate nursing students samples. Facione (1994) also states that these instruments are for college and university level individuals. An instrument that accounts for graduate level preparation and nursing context specific measurement should be explored. As well, the inclusion of creativity and intuition as potential critical thinking skills in nursing should be examined.

Recommendations

Based on this study, the following recommendations for future research and practice are offered. First, the recommendations for research are presented below. Based on the results from this study and a lack of previously published research that explores nurse educators' critical thinking, more research needs to be completed in this area.

1. Further qualitative research studies should be completed with nurse educators about critical thinking.
2. This study should be replicated using a larger sample size and different nurse educator populations.

3. Research studies to examine a variety of variables, in addition to those explored in this study should be completed.
4. Further exploration and measurement of nurse educators' self-regulation as a component of critical thinking should be completed.
5. Critical thinking of nurse educators should be explored together with their self-directedness and learning styles.
6. Faculty development activities specifically developed to facilitate or develop nurse educators' critical thinking should be studied using a variety of research designs.

This study also impacts nursing practice and the teaching practice of nurse educators. In order to further investigate the critical thinking of nurse educators, the following recommendations for practice are offered for both the individual nurse educator and for nursing programs.

1. Nursing programs should explore nurse educators' critical thinking by establishing informal discussions where faculty can discuss the various aspects of critical thinking and how it is being applied in teaching practice.
2. Nursing programs should offer measurement of both nurse educators' critical thinking skills and dispositions as a tool to promote self-awareness and self-evaluation.
3. Nursing programs should implement faculty development opportunities for nurse educators to support and develop their critical thinking.
4. Nurse educators should explore their own critical thinking and how it is demonstrated and applied in their teaching practice.

Conclusion

In conclusion, this study has provided some beginning discussion related to the critical thinking of nurse educators. Critical thinking remains complex and intricately woven into nursing education. It is clear from this study that nurse educators may possess relatively high levels of critical thinking and demonstrate the necessary dispositions to think critically. Nursing educational programs should offer professional development opportunities to ensure faculty feel comfortable in effectively demonstrating the skills and dispositions required for critical thinking.

Critical thinking cannot occur in a vacuum, therefore nurse educators should assume an active role in ensuring critical thinking exists and is understood in nursing educational contexts. If nurse educators demonstrate competence related to critical thinking, students can better learn and role model these skills in practice. It has been through the voices and participation of nurse educators in this study that various facets of how critical thinking exists in a nurse educator population have been illuminated.

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Appendix A – Letter of Invitation

(Date and Address)
Dear (potential participant's name),

My name is Christy Raymond and I am currently involved in a research project that explores the critical thinking of nurse educators. This study is being completed as a partial requirement for my Master's Degree in Adult and Higher Education at the University of Alberta. This study involves completion of two critical thinking assessment tools, which measure critical thinking skills and dispositions, and the potential for being selected to complete an interview.

Your participation in this project will provide useful and valuable information about how nurse educators perceive and practice critical thinking in a nursing education context. For the first stage of the research I am inviting all members from your faculty regardless of age, length of teaching experience, or level of educational training to complete the two self-reporting measures. From the group of those who have completed the assessment tools, 4 to 6 will be invited to participate in a one-hour interview. The time commitment for this study is 1.5 hours for completion of the assessment tools, and then one additional hour for if you are selected and willing to complete the interview portion of this study.

All participants who have completed the two assessment tools in the first stage of the research will receive their respective critical thinking assessment tools scores in writing after the completion of the study. For the interview participants of the study, a one-page summary of the transcribed interview will be sent to each participant for review, and to ensure their interview responses are accurately interpreted.

Participation in this study is completely voluntary. All participants have the right to refuse participation at any time during this study without harm or penalty. All research will be conducted at a convenient location for the participant. All data collected from this study is confidential and will only be used for research, presentation, and publication purposes. Participants will be assigned identification

numbers to preserve confidentiality. The name and location of the selected research site will also be omitted from any produced and/or published documents. All collected data will be secured and stored for a period of 5 years. Any transcriber(s) involved in this study will also comply with all confidentiality standards.

Although there are no foreseeable physical risks to the participant in this study, measuring each participant's critical thinking skills and dispositions will be part of this research project. If you are not comfortable completing these tools, which reveal personal measurements, please feel free to decline from participating in this study. Benefits for the participants include an increased awareness of critical thinking in nursing education. A presentation of the results of the study will also be offered to the selected site.

I look forward to your participation in this research study. Please feel free to contact me if you would like to participate, or if you would like more information about participating in this research.

Sincerely,

Christy Raymond RN, BScN, MEd(c)
Researcher

Appendix B – Letter of Consent

Study Name: Exploring the Critical Thinking of Nurse Educators

Researcher: Christy L. Raymond

This study explores how nurse educators perceive and practice critical thinking in a nursing education context. This project is being conducted as a partial requirement for my Master's Degree in Adult and Higher Education at the University of Alberta.

There are no foreseeable physical risks for the participants in this study however, the exploration of personal measurements using the critical thinking skills test and disposition inventory may cause psychological discomfort for the participant. No payment or monetary compensation is associated with participating in this study.

I agree to participate in this research study and I understand the following:

1. the time required for the completion of the two critical thinking assessment tools is 1.5 hours.
2. the time required for the completion of the interview is 1.0 hour.
3. the nature of my participation is completely voluntary. I may choose to withdraw my participation from this study at any time without penalty.
4. all data collected is confidential and will be secured for a period of 5 years.
5. each participant's data collected will be anonymitized. Data may be utilized in the researcher's thesis, conference presentations and related publishable papers.
6. if any questions or concerns arise related to this research study, I can contact:
    a. Christy Raymond – Researcher
    b. Dr. Paula Brook – Researcher's Supervisor
    c. The Chair of the Research Ethics Board

_____	_____	_____
Participant's name (printed)	Participant's signature	Date
Christy L. Raymond	_____	_____
Researcher	Researcher's signature	Date

Appendix C – Demographic Survey

PLEASE complete this demographic survey AFTER you have completed the critical thinking self-reporting assessments.

1. Participant ID Number: _____

2. Age (in years): _____

3. Level (s) of educational preparation: - please check **ALL** levels of education received.

   _____ Baccalaureate Degree

   _____ Master's Degree in Nursing

   _____ Master's Degree (Other – please specify: _____)

   _____ Doctoral Degree

   _____ Post-Doctoral Study AREA: _____

4. Number of years teaching nursing: _____

5. Number of years as a Registered Nurse: _____

6. Please indicate how you believe you scored on the following critical thinking assessment tools:

   a) California Critical Thinking Disposition Inventory (CCTDI)

   _____ Above Average _____ Below Average

   b) California Critical Thinking Skills Test (CCTST)

   _____ Above Average _____ Below Average

Thank you for your time and for your responses. *Please return this survey and the assessment tool materials to the invigilator before leaving.*

Appendix D – Interview Guidelines

A brief pre-constructed script the study and the purpose of the interview will be read at the start of the interview. The consent form would have been signed earlier in the first stage of the research but it would be reviewed at this time.

Questions:

1. How do you define or describe critical thinking?

2. Do you believe there is a difference between critical thinking and "general" thinking? If so, how would you describe this difference?

3. Describe an incident where you used or demonstrated critical thinking.
    a. What specific qualities, skills, or activities do you believe reflected your ability to think critically?

4. What are 2 critical thinking strategies or approaches that you use as part of your teaching?

5. What factors do you believe positively influence your critical thinking and its ongoing development?

6. What factors do you believe negatively influence your critical thinking and its ongoing development?

I would thank the participant for their time and responses. I would also tell the participants at this time, that all responses would be treated confidentially